

CLAIMS

1. A wire bonding apparatus comprising:

- a carrying table which holds an object of bonding,
- a capillary holding body which has at its tip end a capillary through which a bonding wire passes,
- a holding body holder which holds said capillary holding body,
- a holder actuator which moves said holding body holder in relative terms with respect to an upper surface of said carrying table, thus moving said capillary so that said capillary is brought to contact with and separate from said carrying table, and
- a holding body actuator which is disposed between said holding body holder and said capillary holding body and moves said capillary holding body in relative terms with respect to said holding body holder; and wherein

said holding body actuator causes said holder actuator to move said capillary upward when said capillary and said upper surface of said carrying table are brought to positionally close to each other.

2. The wire bonding apparatus according to Claim 1, further comprising:

- an impact detection sensor which detects an impact received by said capillary from said upper surface of said carrying table caused by a contact of said capillary with said upper surface of said carrying table and outputs a detection signal, and
- a control means that controls a driving of said holding body actuator based upon said detection signal.

3. The wire bonding apparatus according to Claim 1, wherein

- said capillary holding body extends along said upper surface of said carrying table and has at its tip end a capillary that is disposed so that said capillary extends downward toward said upper surface of said carrying table,
- said holding body actuator has a pair of complementary action type extension and retraction driving elements that are attached between a pair of holding body side attachment positions, which are disposed on said capillary holding body so that said positions are separated in a direction of extension of said capillary holding body, and a pair of holder

side attachment positions, which are disposed on said holding body holder at locations corresponding to said holding body side attachment positions, and

said pair of complementary action type extension and retraction driving elements is arranged so that when one extension and retraction driving element makes an extension action, another element makes a retraction action.

4. The wire bonding apparatus according to Claim 3, wherein

said pair of complementary action type extension and retraction driving elements is disposed so that a normal line intersection point where a first normal line and a second normal line are crossed is located in a position that corresponds to said upper surface of said carrying table,

said first normal line extending from said holding body side attachment position of one extension and retraction driving element in a direction perpendicular to a direction of an extension and retraction driving force that is applied to said holding body side attachment position, and

said second normal line extending from said holding body side attachment position of another extension and retraction driving element in a direction perpendicular to a direction of an extension and retraction driving force that is applied to said holding body side attachment position; and

said holding body actuator causes said capillary holding body to swing about a center of swing which is said normal line intersection point.

5. The wire bonding apparatus according to Claim 4, wherein said center of swing is disposed between a position of a center of gravity of said capillary holding body and a position where said capillary is disposed.

6. The wire bonding apparatus according to any one of Claims 1 through 5, wherein said holding body actuator is a piezo-electric element.

7. The wire bonding apparatus according to Claim 6, wherein when said piezo-electric element is not making a relative movement of said capillary holding body with respect to said holding body holder, said piezo-electric element receives an impact acted on said capillary by said upper surface of said carrying table and outputs a detection signal.

8. The wire bonding apparatus according to any one of Claims 1 through 5, wherein said capillary holding body is an ultrasonic transducer.

9. The wire bonding apparatus according to Claim 6, wherein said capillary holding body is an ultrasonic transducer.

10. The wire bonding apparatus according to Claim 7, wherein said capillary holding body is an ultrasonic transducer.